DOCUMENT RESUME

ED 148 896 TM 006 836

AUTHOR Staley, Richard K.; Wolf, Richard I.
TITLE Adjunct Questions in Prose Learning: The Effects of Response Mode.
PUB DATE 5 May 77
NOTE 9p.; Paper presented at the Annual Meeting of the New England Educational Research Association (9th, Manchester, New Hampshire, May 4-7, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Advance Organizers; Cognitive Style; *Factual Reading; Higher Education; *Learning Processes; Multiple Choice Tests; Performance Factors; Prose; *Questioning Techniques; Recall (Psychological); *Response Mode; *Retention; Test Items; Undergraduate Students

ABSTRACT

A 3 x 3 x 2 factorial design was used with 120 undergraduate subjects to study the effects of question type on learning from prose. A 2,000-word reading passage on geological history was presented, with factual questions on each page. Questions were also presented after the reading activity. When compared to a reading only control group, the short answer adjunct questions appeared to exert a stronger influence on processing strategies than did multiple choice questions. The direction of the adjunct question effect was the same for both question types as evidenced by the lack of a significant question type or learning subtest interaction. (Author/MV)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED148896

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Richard K. Staley

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Adjunct Questions in Prose Learning: The Effects of Response Mode

Richard K. Staley
and
Richard I. Wolf

SUNY, College at Oneonta

A Paper Presented
at

New England Educational Research Organization
Manchester, New Hampshire

May 5, 1977

TM006 836

The effects of inserted questions on learning from prose have been thoroughly studied. The concept of mathemagenic behavior, or behavior that gives birth to learning, has its origin in the work of Rothkopf (1970) on learning from prose. The research has shown the structure of prose passages can control mathemagenic behaviors and hence facilitate learning. The most studied of these structural variables has been inserted questions; their placement, frequency of occurrence, and type.

Studies of prose learning involving adjunct or inserted questions employ either short answer/completion or multiple choice questions. Typically generalizations are drawn across studies without regard to the response mode utilized in the studies under consideration. Yet Anderson and Biddle (1975) in an extensive review of the research concluded that both the direct and indirect effects of adjunct questions were stronger with completion or short answer questions than multiple choice questions. The direction of the effects appears to be the same regardless of the response mode. However no one has conducted a direct empirical test to compare the effects of completion and multiple choice questions in prose learning, hence the purpose of the present study.

It was hypothesized that completion-type adjunct questions would exert greater control over mathemagenic behaviors, when compared to an appropriate reading only control group, than do multiple choice-type adjunct questions. The rationale for this hypothesis follows the line of reasoning below. Frase (1970) concluded that inserted questions influence learning from prose by controlling such mathe-

magenic behaviors as inspection of text and rehearsal mathemagenic behaviors, defined as behaviors which give birth to learning, are a subset of information-processing strategies. Anderson (1970) has stated as an information-processing system humans operate in a manner analogous to an electric current (i.e., they follow the path of least resistance). In other words, people commit only that portion of their information-processing capacity necessary to perform the given task.

Research on retention suggest that completion questions would place greater information-processing demands on students than mulple choice questions. Retention scores for recall are much lower than scores on a recognition measure (Postman & Rau, 1957). Therefore students, who encounter completion questions as they read, exert greater processing efforts than students encountering multiple choice questions. The particular processing strategies engaged in by the students will be determined by the position of the questions. Consequently it was hypothesized that question position would affect the direction of learning (more or less intentional or incidental) but not the magnitude of learning.

Method

Subjects

Particpants in this experiment were 120 undergraduates enrolled in undergraduate educational psychology courses at State University College, Oneonta. All students participated in the study to fulfill a course credit requirement. Students were randomly assigned to

treatment groups.

Materials

The experimental task was one used in studies by Boker (1974) and Stacey and Wolf (1976) and consisted of a 2000 word reading passage on geological history divided into 10 pages of approximately equal length. For each page of the prose passage four test questions on factual information were constructed. These four questions were prepared in both completion and multiple choice forms to measure the selected factual information.

These two sets of 40 test questions were divided into two subtests, so that each subtest consisted of two of the four questions for each of the 10 pages of reading materials. One subtest was selected as the intentional learning subtest and these questions were also used as the inserted questions for those treatment groups. The other subtest was designated the incidental learning subtest and none of the subjects received these questions until the posttest (comprised of the intentional and incidental subtests). The reliability of the 40 question posttest was .77 for the multiple choice form and .83 for the completion form using the Kuder-Richardson Formula 20.

Procedures

This study employed three question placement conditions with a completion and multiple choice group within each for a total of six treatment groups. The pre-questions group had adjunct questions inserted on a separate page before the page of reading material in

which the information to answer the questions were found and vice versa for the post-questions group. The reading only control groups got only the 10 pages of reading material with no adjunct questions.

All treatment groups were given their materials in an envelop with the instructions to:

1. proceed at their own rate on the task
2. remove one page at a time from the envelop
3. return each page to the envelop when finished with it
4. do not look back at a page after it has been returned to the envelop and
5. expect a test over the reading passage after completion of reading

Additionally, subjects in the pre-questions and post-questions groups were told to attempt to answer any questions that they may encounter during reading. No knowledge of results was provided for the adjunct questions.

Results and Discussion

The design of the study was a 3 x 3 x 2 factorial analysis of variance with repeated measures on one factor. The factor with three levels was position of the adjunct questions within the prose passages. The second factor was question type, either completion or multiple choice. The repeated measures were taken on the third factor, which consisted of the intentional and incidental learning subtests. Specific ad hoc comparisons of treatment means was done utilizing Duncan's Multiple Range Test.

The mean for each cell in the analysis of variance is presented

in Table 1. As to be expected the main effect for question type was significant with scores on the completion measure being lower than the multiple choice ($F = 72.79$, $df = 1/114$, $p < .01$). The question position main effect was significant ($F = 13.15$, $df = 2/114$, $p < .01$) and the follow up comparisons showed that the difference was between the post question groups and the control groups.

Table 1

Means for Treatment Groups

	Intentional Learning	Incidental Learning	Total
	Multiple Choice		
Pre-questions	14.00	11.85	25.85
Post-questions	14.05	11.70	25.75
Reading Only	12.35	11.50	23.85
	Completion		
Pre-questions	9.25	6.55	15.80
Post-qeustions	12.15	9.40	21.55
Reading Only	4.80	4.70	9.50

The interaction releyant to the magnitude hypothesis was the question type x question position and it was significant ($F = 6.93$, $df = 2/114$, p .01). Comparisons of group means showed that both the pre-question and post-question completion groups scored significantly higher than the reading only control/group that had a completion post-test. There were no significant differences among any of the treatment groups receiving multiple choice questions.

The direction hypothesis was tested by the question position X learning subtest (intentional or incidental). This interaction was significant ($F = 8.39$, $df = 2/114$, $p < .01$). Pre-question and post-question groups scored significantly higher on the intentional subtest than the control group. There was no significant differences among the three groups on the incidental subtest. Both pre-question and post-question groups scored significantly higher on the intentional than on the incidental subtest, while there was no difference on the two subtests for the control group.

Results of this study support the conclusion that the effects of adjunct questions depend upon the form of those questions. Multiple choice questions did not seem to exert effective control over mathemagenic behaviors while completion type questions do. Further research should investigate whether or not question type interacts with subject matter characteristics and learner's behavior knowledge of the subject to produce differential effects.

Simple conclusions about the direction of effects and question position cannot be drawn from this study. The only differences among groups were higher intentional learning for both groups which received questions. There were no significant differences among the groups for incidental learning. These results suggest that the effect on adjuncts could be due to practice on specific test items rather than control of mathemagenic behaviors. Since a question group for this interaction was based on both the completion and multiple choice groups, we cannot draw a definitive conclusion. The multiple choice groups could have reduced the means for each group sufficiently to mask any significant difference.

References

Anderson, R. C. Control of student mediating processes during verbal learning and instruction. Review of Educational Research, 1970, 40, 344-369.

Anderson, R. C. & Biddle, W. B. On asking people questions about what they are reading. In G. H. Bower (ed.), The psychology of learning and motivation: Advances in research and theory, Volume 9. New York: Academic Press, 1975.

Boker, J. R. Immediate and delayed retention effects of interspersing questions in written instructional passages. Journal of Educational Psychology, 1974, 66, 96-98.

Frase, L. T. Boundary conditions for mathemagenic behaviors. Review of Educational Research, 1970, 40, 337-347.

Postman, L., & Rau, L. Retention as a function of the method of measurement. University of California Publication in Psychology, 1957, 217-270.

Rothkopf, E. Z. The concept of mathemagenic activities. Review of Educational Research, 1970, 40, 325-335.

Reference Note

Staley, R. K., & Wolf, R. I. Test anxiety and inserted questions in learning from written discourse. Paper presented at meeting of New England Educational Research Organization, Provincetown, Massachusetts, May, 1976.